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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,216	12/20/2001	Stephen K. Gilbert	706146US1	7772

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EXAMINER

KITOV, ZEEV

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 08/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/034,216

Applicant(s)

GILBERT ET AL.

Examiner

Zeev Kitov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8, 9 - 11 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Objection

Claim 7 is objected to due to an apparent typing error. The claim recites "the supplemental inverter output", which has no antecedent basis. It obviously should be replaced by: "the supplemental converter output". Appropriate correction is required.

2. Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 - 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Nelson LT1070 Design Manual, Linear Technology Application Note 19. Nelson discloses most of the elements of the claim including a voltage converter having a direct current input voltage source, which is inherently exists in any voltage converter; a voltage transforming element having an input coupled to the input voltage source and an output presenting a voltage signal thereon (element T1 on page 46); a switching element coupled to the voltage transforming element (output Vsw on page 46, switch output terminal in Block diagram on page 7)

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intermittently interrupting current flow from the input voltage source to the voltage transforming element; a converter output (V_{out} on page 46)) coupled to the output of the voltage transforming element via a rectifier (element D1 on page 46) and presenting a converter output voltage to a load; and a programmable controller (element LT1070 on page 46) having an input coupled to the converter output (input FB on page 46) and an output coupled to the switching element (output V_{sw} on Page 46). The programmable controller operates to control switching states of the switching element in accordance with preselected, programmable operating parameters of the voltage converter. Controller shown on page 46 has its switching parameters and an output voltage being fixed by selection of R5, R6 and R3. The converter shown in Fig.25 has its switching parameters and the output voltage programmable by use of potentiometer 5K, which is a part of R2 resistance (page 10, col. 1, Compensation Pin (V_c) headline through page 11, col. 1, last line).

Regarding Claim 2, Nelson discloses a fault prevention circuit (elements D1 and D2 in Fig. 9) coupled between the programmable controller output and the switching element.

Regarding Claim 3, Nelson discloses a supplemental voltage transforming element output (bottom N winding in Fig. 25) coupled via a supplemental rectifier (bottom diode D1 in Fig. 25) to a supplemental converter output presenting a supplemental converter output voltage to a supplemental load, wherein the supplemental converter output voltage is different from the converter output voltage (-15v vs. +15V).

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Regarding Claim 4, Nelson discloses the programmable controller, which controls the switching states of the switching element via a pulse-width-modulated switching signal (page 7, col. 1 and 2).

Regarding Claim 5, Nelson discloses the voltage converter further having a programmable controller protection circuitry (zener diode 5.6V in Fig. 4, page 9, col. 1 and 2) coupled between the converter output and the programmable controller input.

3. Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

a) Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson, LT 1070 Design Manual, Linear Technology Application Note 19 in a view of Layden (US 5,001,399). As was stated above, Nelson discloses all the elements of Claim 1. However, regarding Claims 6 and 7, it does not disclose the converter output adapted to be coupled to a vacuum fluorescent display. Layden discloses the vacuum fluorescent display supply voltages as being 3 – 6 volts for filament, 20 – 40 volts for plates and grids and negative 2 – 6 volts for the plate to be cutoff or dark. Accordingly, the circuits and methods disclosed by Nelson make possible adapting the circuit of Fig. 25 to produce at least the 3 – 6 and 20

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– 40 volts simultaneously. It is a matter of adjusting parameters of the circuit according to formulas 90 – 99 (page 35, Totally isolated converter headline column through page 38, col. 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Fig. 25 of Nelson adapting it to generated voltages according to specification of the vacuum fluorescent display, because as Layden states (col. 1, lines 18 – 22), the vacuum fluorescent displays have some advantages. It is matter of the designer choice, whether to use the vacuum fluorescent displays or liquid crystal displays. Each one has its advantages and disadvantages.

b) Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welches (US 6,404,655) in a view of Williams et al. Some Thoughts on DC-DC Converters, Linear Technology, Application Note 29. Welches discloses most of the elements of the claim including a voltage converter having a direct current input voltage source (provided by element 30 in Fig. 1); a switching transistors (elements IGBT1 and IGBT2 in Fig. 3) coupled to the windings (elements L6 – L8) and operative in a first switching state to allow current flow from the input voltage source through the winding and operative in a second switching state to inhibit said current flow; a converter output coupled to the winding via a rectification circuit (elements D7 and D8 in Fig. 3) presenting a converter output voltage to a load; and a microprocessor-based controller (element 100 in Fig. 1, col. 7, lines 7 – 27) having an input () coupled to the rectification circuit and an output coupled to the switching transistor (through TC4427 element in Fig. A-1),

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the controller operative to selectively place the switching transistor in its first and second switching states in accordance with preselected, programmable operating parameters of the voltage converter. However, it does not disclose a transformer.

Williams et al. disclose the transformer (shown in Fig. 19B, page 13) having primary and secondary windings, the primary winding being coupled to the input voltage source (+12N in Fig. 19B, page 13). Both references have the same problem solving area, namely providing DC/DC voltage conversion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Fosler solution according to a teaching of Williams et al., because as well known in the art, use of the step-up transformer in a flyback voltage converter makes possible both stepping up the voltage and providing a galvanic isolation between the voltage converter and multiple loads.

b) Claims 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al., Some Thoughts on DC-DC Converters, Linear Technology, Application Note 29, in a view of Palmer, Using PWM, Application Note 564 from Microchip Technology Inc. Williams et al. discloses most of the elements of the claim including a voltage converter having a direct current input voltage source (12V element in Fig. 19B); a switching transistors (inherent in the structure of the LT1070 converter associated with terminal Vsw in Fig. 19B) and operative in a first switching state to allow current flow from the input voltage

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source through the winding and operative in a second switching state to inhibit said current flow; a converter coupled to the transformer secondary winding (element L1 in Fig. 19B) via rectification circuit (element MBR360 in Fig. 19B) and presenting the converter output voltage to a load. It further discloses a controller having an input coupled to the rectification circuit (through elements R7, C3, A1, R6 and 74C04 inverters in Fig. 19B) and an output coupled to the switching transistor, the controller operative to selectively place the switching transistor in its first and second switching states in accordance with preselected, programmable operating parameters of the voltage converter (set by selection of a capacitor C2 in Fig. 19B). However, it does not disclose a microprocessor-based controller. Palmer discloses use of RISC microcontroller, such as PIC17C42, for generation of PWM signals, which are the core of DC/DC conversion methods. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Williams et al. solution DC/DC converter replacing the LT1070 converter by the microcontroller based solution according to Palmer, because as Palmer states (page 1, col. 1, lines 1- 6), it provides advanced performance and cost effective solution for PWM generation.

Further, as well known in the art, use of microcontroller as a replacement for a hardwired control device leads to substantial flexibility in adaptation of the converter to changing load requirements.

Regarding Claim 10, Williams et al. disclose a Zener diode voltage clamp coupled to the controller input (element LT1004 in Fig. 19B) to maintain voltage input to the controller within preselected limits.

Regarding Claim 11, Williams et al. disclose the controller selectively placing the switching transistor in its first and second switching states in accordance with a pulse width modulated signal on the controller output. This is inherent in the principle of the PWM voltage converter operation (page 11, col. 2, "Low Quiescent Current Micropower 1.5 to 5V Converter" headline through page 15, col. 1, line 6).

4. Allowable Subject Matter

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. A reason for that is that the claim recites a fault prevention circuit coupled between the controller output and the switching transistor; the fault protection circuit includes a shunting transistor diverting a base drive current from the switching transistor upon the occurrence of a controller fault. Such limitation was not found in a collected prior art of the record.

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5. Conclusion

The prior art made of record not relied upon is considered pertinent to applicant's disclosure: US 6,404,655, US 6,392,384, US 5,534,771, US 5,680,034, US 5,264,780.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose telephone number is (703) 305-0759. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (703) 308-3119. The fax phone numbers for organization where this application or proceedings is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Z.K.
08/06/2003


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